Appendix C

Sample Descriptions

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Sample Descriptions

This appendix provides a tabular and photographic summary of OU 7-13/14 samples taken during the OU 7-10 Glovebox Excavator Method Project at the SDA. Table C-1 lists in tabular format the summary sample description. The field description is summarized as described in the OU 7-13/14 Field Representative GEM Logbook-Glovebox Book (Olson 2004a). The lab description is a summary of the visual observations made while photographing the samples. The appearance category is the synopsis of all three descriptions made by the authors. Field categories are reported as recorded in the OU 7-13/14 Field Representative GEM Logbook (Olson 2004). The accuracy of the categorization is dependent upon the field representative and their interpretation.

Additionally, a summary is provided for each sample acquired during the RWSC Project. Included in this section is the waste description of the observations recorded by field personnel, including sample location (i.e., reach, angle, and depth as described earlier in Appendix B), appearance, and moisture content. Information describing the dig face and comments obtained during photography are also included. Finally, a table summarizing results from the chemical analyses of each sample is provided to assist in the categorization of the sample into clean or nearly clean, low-contamination soil, mixed soil-waste, soil scraped from graphite, soil after rupture of graphite scarfings jar, organic waste, and unknown waste types I and II. A detailed description of the excavation process can be found in Appendix B. Additionally, a full report explains the entire Glovebox Excavator Method Project (DOE-ID 2004).

C-1. Summary Sample Description

Table C-1. Summary of the sample number, field category, field description, lab description, and appearance category data in a table format.

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
BLANK SOIL		INL soil blank	None provided	Medium brown-gray soil, fine-grained, large clods, no debris or sludge.	Clean soil
P9GW04013A	1/27/2004	Overburden	None provided	Medium brown-gray soil, fine-grained, large clods, no debris or sludge.	Clean soil
P9GW09013A	1/27/2004	Overburden	None provided	Medium brown-gray soil, fine-grained, large clods, no debris or sludge.	Clean soil
P9GW12013A	1/27/2004	Overburden	None provided	Medium brown-gray soil, fine-grained, large clods, no debris or sludge.	Clean soil
P9GW13013A	1/27/2004	Overburden	None provided	Medium brown-gray soil, fine-grained, large clods, no debris or sludge.	Clean soil

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GW15013A	1/29/2004	Overburden	None provided	Medium brown-gray soil, fine-grained, large clods, no debris or sludge.	Clean soil
P9GW21013A	1/29/2004	Overburden	None provided	Medium brown-gray soil, fine-grained, large clods, no debris or sludge.	Clean soil
P9GT09016G	2/13/2004	Soil, appears clean	Lightly colored soil, with variable moisture, collected from underneath a drum that contained graphite.	Medium brown, fine particulate soil, with no visible signs of sludge or debris.	Clean soil
P9GT10016G	2/14/2004	Soil, appears clean	Moist to very moist medium brown soil, collected near a drum containing wood blocks. Standing water could have saturated some contents of this scoop. Bags, debris, and corroding drums were proximate to the sample location.	Medium brown, fine particulate soil, with no visible signs of sludge or debris.	Clean soil
P9GT13016G	2/17/2004	Soil, appears clean	Nondescript soil collected from beneath skewered drum. There was a potential for mixing of drum contents with proximate soil, but no sludge or debris were noted.	Medium brown, fine particulate soil, with large clay clods present. Traces of small white particulates.	Clean soil
P9GT21016G	2/17/2004	Soil with <1% sludge	Moist soil mixed with off-white chunks of calcite. Collected from a cavity left by a removed drum.	A medium brown, fine-grained particulate soil, with a few off-white chunks of calcite. No evidence for debris.	Clean soil
P9GT22016G	2/17/2004	Soil, appears clean	Cloddy soil, fine-grained with medium brown color, no evidence for debris.	Medium brown soil, with larger clay clods. No evidence for sludge or debris.	Clean soil
P9GT24016G	2/17/2004	Soil, appears clean	Loose soil collected from beneath skewered inorganic sludge drum. No evidence for debris or for sludge.	Medium grained soil, a few small whitish inclusions that are possibly carbonate. No sludge or debris observed.	Clean soil

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GT28016G	2/19/2004	Soil, appears clean	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Dark brown, fine-grained soil sample, with no foreign debris present.	Clean soil
P9GT32016G	2/19/2004	Soil, appears clean. Located beneath graphite drum.	Moist fine-grained soil, with no evidence of debris, graphite, or sludge.	Dark brown fine-grained sample with no evidence of foreign debris contamination.	Clean soil
P9GT34016G	2/19/2004	Soil, appears clean. Located beneath graphite drum.	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Dark brown fine-grained sample, with a few small calcite and basalt particulates.	Clean soil
P9GT08016G	2/13/2004	Soil, appears clean	Lightly colored soil, with variable moisture, collected from underneath a drum that contained graphite.	Light brown, fine particulate soil with a few bits of rusted drum. Generally little debris.	Clean-to-mostly clean soil
P9GT11016G	2/14/2004	Soil, visually clean	Moist to very moist medium brown soil, collected near a drum containing wood blocks. Standing water could have saturated some contents of this scoop. Bags, debris, and corroding drums were proximate to the sample location.	Medium brown, fine particulate soil, with no visible signs of sludge or debris. A small quantity of fine white particles were observed.	Clean-to-mostly clean soil
P9GT12016G	2/14/2004	Soil, visibly clean	Moist to very moist medium brown soil, collected near a drum containing wood blocks. Standing water could have saturated some contents of this scoop. Bags, debris, and corroding drums were proximate to the sample location.	Medium brown, fine particulate soil, with no visible signs of sludge, but a small quantity of rust debris present.	Clean-to-mostly clean soil

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GT14016G	2/17/2004	Soil with <1% sludge	Moist interstitial soil with few small off-white chunks of calcite. The sample was collected from a cavity around a corroded drum.	Medium brown fine particulate soil with small off-white calcium carbonate chunks. No debris	Clean-to-mostly clean soil
P9GT15016G	2/17/2004	Soil with <1% sludge	Moist interstitial soil with few small off-white chunks of calcite. The sample was collected from a cavity around a corroded drum.	Medium brown fine particulate soil just a few small off-white calcite chunks, and a few rust flecks.	Clean-to-mostly clean soil
P9GT16016G	2/17/2004	Soil with <1% sludge	Moist interstitial soil with few small off-white chunks of calcite. The sample was collected from a cavity around a corroded drum.	Medium brown fine particulate soil with larger off-white chunk of calcite. Some small amounts of drum rust.	Clean-to-mostly clean soil
P9GT18016G	2/17/2004	Soil with <1% sludge	Moist interstitial soil with few small off-white chunks of calcite. The sample was collected from a cavity around a corroded drum.	Medium brown, fine-grained soil, with off-white chunk of calcite.	Clean-to-mostly clean soil
P9GT20016G	2/17/2004	Soil with <1% sludge	Moist soil mixed with off-white calcite chunks. Collected from a cavity left by a removed drum.	A medium brown, fine-grained particulate soil, with a few off-white calcite chunks. One black inclusion may be dark drum rust.	Clean-to-mostly clean soil
P9GT23016G	2/17/2004	Soil with <1% sludge	Loose soil collected from beneath skewered drum. No evidence for debris or for sludge.	Brown gray fine-grained soil, possible black or rust flecks present.	Clean to mostly clean soil
P9GT25016G	2/17/2004	Soil, appears clean	Loose soil collected from beneath skewered drum. No evidence for debris or for sludge.	Light brown/gray fine-grained soil, with a few small off-white particulates. Some larger soil clumps present.	Clean-to-mostly clean soil
P9GT26016G	2/17/2004	Soil, appears clean	Loose soil collected from beneath skewered drum. No evidence for debris or for sludge.	Light brown/gray fine-grained soil, with few small off-white particulates. Some larger soil clumps present.	Clean-to-mostly clean soil

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GT29016G	2/19/2004	Soil, very slight mixed (<1%)	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Dark brown, fine-grained sample. It has a reasonably sized chunk of rusting metal in it.	Clean to mostly clean soil
P9GT30016G	2/19/2004	Soil, very slight mixed (<1%)	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Medium brown, fine-grained sample, with yellowish white paper in the sample. Small off-white particulates are also present.	Clean to mostly clean soil
P9GT31016G	2/19/2004	Soil, appears clean. Located beneath graphite drum.	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Medium brown fine-grained sample with rust and possibly off-white unidentified particulate in it.	Clean to mostly clean soil
P9GT33016G	2/19/2004	Soil, appears clean. Located beneath graphite drum.	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Dark brown fine-grained sample, with a few small off-white particulates.	Clean-to-mostly clean soil
P9GT35016G	2/19/2004	Soil, appears clean. Located beneath graphite drum.	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Medium brown fine-grained sample, with a few rusting metal flakes.	Clean-to-mostly clean soil
P9GT36016G	2/19/2004	Soil, appears clean. Located beneath graphite drum.	Moist fine-grained soil, with no evidence for debris, graphite, or sludge.	Medium brown fine-grained sample, with clods. Contains rusting metal flakes and a rusting nail.	Clean-to-mostly clean soil
P9GT01016G	2/2/2004	Soil mixed with debris	Predominantly soil (est. 98%), mixed with bits of rust collected from a scoop believed to contain probable inorganic sludge. Region contained a heavily corroded drum.	A dark brown particulate soil, with a modest amount of clumping tendency. Contained plastic debris, and rust particulates.	Mixed soil-unknown waste

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GT02016G	2/2/2004	Soil mixed with rust and debris.	Predominantly soil (est. 99%), with bits of rusted drum collected from a scoop that contained a 4-in. ball of stained material possibly sludge. Blackish material noted near dig face, probably not graphite. No drums nearby, only bits of plastic.	A dark brown particulate soil, with minor rust and fabric debris.	Mixed soil-unknown waste
P9GT03016G	2/8/2004	Soil mixed with probable sludge	Clumped soil with minor amounts of pea-sized foreign material and some off-white granular, unidentified material. A large mass of putty-like sludge was present in this scoop.	A dark brown particulate soil, with very little visible inclusions. Small pea-sized particulates of unidentified material.	Mixed soil-unknown waste
P9GT04016G	2/8/2004	Soil with <1% sludge	Well broken up, nondescript soil, with some granular off-white inclusions. No sludge or debris was apparent in sample cart.	A dark brown particulate soil, with few inclusions. Small off-white particulates are visible, as are darker drum rust pieces.	Mixed soil-unknown waste
P9GT05016G	2/8/2004	Soil with <1% sludge	Nondescript soil, with off-white inclusions.	A soil mixed 50:50 with tan to off-white clods of unidentified amorphous materials that are probable organic sludge.	Mixed soil-unknown waste
P9GT06016G	2/8/2004	Soil with <1% sludge	Nondescript soil, with off-white inclusions.	A soil mixed 50:50 with tan to off-white clods of unidentified amorphous materials that are probable organic sludge.	Mixed soil-unknown waste

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GT07016G	2/12/2004	Soil mixed with rust and probable organic sludge.	Orange-rust colored, moist, clumpy soil collected from around corroded drum that contained probable sludge. Drum pieces, plastic, and graphite moldings were proximate to the scoop location.	Fine particulate material with a lot of rust present. Some dried clay clods, and dark material, and gray sludge were noted, but not obvious in the photo.	Mixed soil-unknown waste
P9GT17016G	2/17/2004	Soil "candied" w/organic sludge leak-ed from near drum	Moist soil mixed with organic. Collected from a cavity left by a removed drum.	Soil moistened with liquid other than water, possibly organic. Tiny white particulates and rust flecks present. Large clods present.	Mixed soil-unknown waste
P9GT19016G	2/17/2004	Soil "candied" with organic sludge that leaked from an adjacent drum	Moist soil mixed with unidentified off-white calcite chunks. Collected from a cavity left by a removed drum.	A gray/brown/whitish solid, possibly saturated with organic material. The sample had a greasy sheen. No visible visible debris present, only clumped solid.	Mixed soil-unknown waste
P9GT27016G	2/17/2004	Soil scraped directly from graphite mold piece	Moist fine-grained soil scraped from flat pieces of a graphite mold. Severely corroded drums of graphite pieces were excavated, that had been historically infiltrated with soil that was caked to the graphite.	Medium-brown cloddy soil, with flecks of dark gray material present (graphite perhaps). No other evidence for contamination.	Mixed soil-rust-graphite
P9GR04012G	2/1/2004	Organic sludge	Moist clay-like solid with a minor amount of adhering soil. Moderate yellow color with red flecks of rust. From a badly corroded drum that had an intact plastic liner. The liner broke, and the scoop contained a lot of this material.	Off-white solid with pale pink/gray/tan hues. Moist clay-like consistency. Very little or no soil.	Probable organic sludge

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GR20012G	2/2/2004	Organic sludge	Loose soil mixed with probable organic sludge material collected from a zone with a disintegrated drum and liner. Very orange-red solids reported; cart contained mostly loose soil. Associated with soil T01.	Gray-brown clay-like clods mixed with bright rust-red clods. Plastic and paper debris present.	Probable organic sludge
P9GR23012G	2/12/2004	Organic sludge	Gray-olive putty-like solid crusted with soil and rust. From a cart containing grapefruit-sized chunks of graphite molds. Area contained corroded drums originally unstacked. Plastic drum liners appeared to be in reasonably good shape.	Off-white to tan-gray putty-like solid, with a very small amount of rust-colored inclusions.	Probable organic sludge
P9GP01015G	2/1/2004	Inorganic sludge	Gray aggregate clumps with fibrous inclusions, only 1–5% soil. Some orange and yellow orange clods. From heavily corroded drum.	Fibrous white chunks, with brown, rust, yellow and white.	Unknown waste material
P9GP02015G	2/1/2004	Inorganic sludge	Gray solid surrounded by an aggregate coating. Orange-yellow to rust-colored stains. One clump had fibrous threads. From a zone containing a heavily corroded drum, with torn plastic drum liners.	Semi-soft clumpy white solid with significant rust-to-orange colored areas. Numerous dark particulate inclusions.	Unknown waste material
P9GP03015G	2/2/2004	Inorganic sludge	Gray clumpy solid, with orange and white regions. Fibrous inclusions in the sample. From a zone containing numerous pieces of heavily corroded drums. The integrity of plastic drum liners was good here.	Gray solid with significant regions of rust-to-brown coloration. Fibrous material also observed.	Unknown waste material

Table C-1. (continued).

Sample Number	Acquisition Date	Field Category	Field Description	Lab Description[a]	Appearance Category
P9GP04015G	2/2/2004	Inorganic sludge	Gray solid chunks with an aggregate-looking coating. Some of the waste had fibrous threads having an asbestos-like appearance. The surface of the chunks were orange-yellow-rust colored stains. From a zone containing numerous pieces of heavily corroded drums.	The sample looked and felt like solid hard concrete pieces that were locked in the sample jar. Soil-rust-carbonate coating on solid chunks.	Unknown waste material
P9GP05015G	2/2/2004	Inorganic sludge	Gray chunks with aggregate coating consisting of soil, rust and white material (carbonate?). From a zone containing numerous pieces of heavily corroded drums. The integrity of plastic drum liners was good here.	Solid chunks of concrete-like material mixed with soil and rust.	Unknown waste material

a. Chunks of off-white calcite, chunks of concrete, and drum rust were not confirmed analytically. The information is provided as a visual interpretation only.

C-2. Sample Photographic Summary

This section summarizes the observations recorded by field personnel, including sample collection time and date sample location (i.e., reach, angle and depth as described earlier in Appendix B), appearance, and moisture content. The sample color is described using the Geological Society of America's Rock Color Chart (Geological Society of America 1991). The OU 7-13/14 Field Representative GEM Logbook-Glovebox Book contains all the information recorded by the Field Representative in the field (Olson 2004a). The OU 7-13/14 Field Representative GEM Logbook-Excavator Book contains all the information regarding the excavator process and dig face description (Olson 2004b). Please consult both references for in-depth descriptions. Data presented are a summary of the details located in the OU 7-13/14 Field Representative GEM Logbook-Glovebox Book (Olson 2004a). Included are digital images taken for sample photography. Photographs of the 10 samples subjected to the entire regime of sample characterization activities are included. Note that differences in printers may cause variability in colors shown. For accurate sample information, read the description provided.

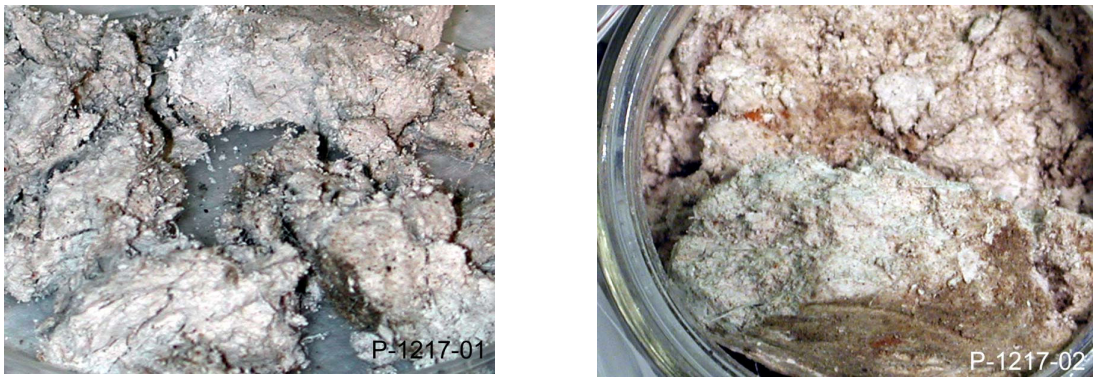

Figure C-1. A photographic image of sample P9GP01015G in a dish (left) in a jar (right).

Waste Description for P9GP01015G

Sample P9GP01015G was collected from scoop #1132 on February 1, 2004 at 13:03 hr. The sample weight was 0.76g. The scoop was retrieved at a reach of 9.44 ft, an angle of 3.5 degrees, and a depth of 12.82 ft. The field characterization stated the sample was an inorganic sludge. The waste material was described as 1–5% soil content with the balance consisting of sludge. The bags were torn but pliable. The sludge characteristics were described as gray inside surrounded by an aggregate-looking coating. A specific clump of the waste had fibrous threads. The waste was orange-yellow with flakes of rust. The sample was given a color rating of 5YR 5/6 (Geological Society of America 1991). No free liquid was present. The sample was listed as dry. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GP01015G

No description was provided.

Photographic Description P9GP01015G

The sample was characterized in the field as an inorganic sludge. However, the pictorial description depicts the sample as fibrous white massive chunks that resembled fibrous material soaked in acid then buried for more than 30 years. The sample colors associated with the sample are stated as brown, rust, yellow, and white. The sample is similar to sample P9GP03015G with its white solid masses

of fibrous material. There were no characteristics that qualify this sample as a Series 741 inorganic sludge as described in Course Number 300GM028, "Waste Identification, Excavation, Segregation/Sorting, and Disposition."

Table C-2. Data summary table for sample P9GP01015G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GP01015G	Inorganic sludge	2.36 ± 0.21	<15.2	1.8 ± 1.0	4.9 ± 8.3

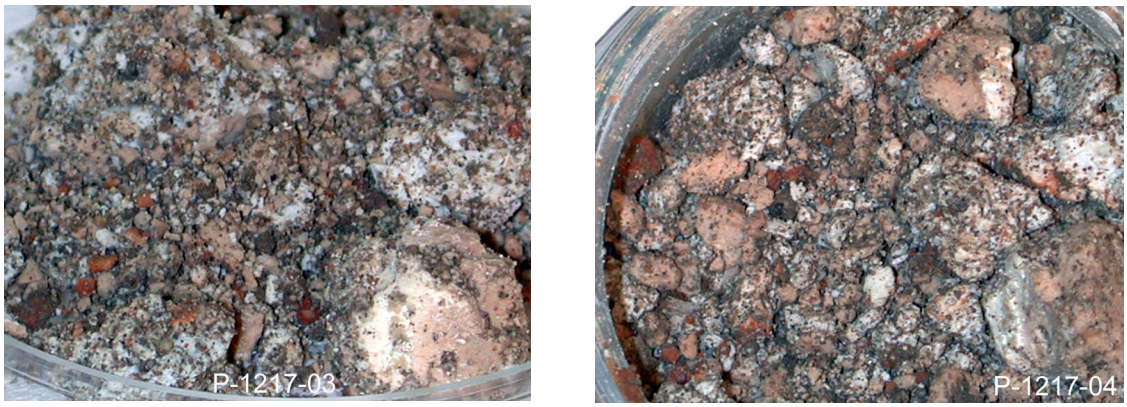

Figure C-2. A photographic image of sample P9GP02015G in a dish (left) in a jar (right).

Waste Description for P9GP02015G

Sample P9GP02015G was collected from scoop #1132 on February 1, 2004 at 13:03 hr. The waste sample was collected from the same cart as sample P9GP01015G. The sample was retrieved at a reach of 9.44 ft, an angle of 3.5 degrees, and a depth of 12.82 ft. The field characterization stated the sample was an inorganic sludge. The waste material was described as 1–5% soil content with the balance consisting of sludge. The bags were torn but pliable. The sludge characteristics were described as gray inside surrounded by an aggregate-looking coating. A specific clump of the waste had fibrous threads. The waste was orange-yellow with flakes of rust. The sample was given a color rating of 5YR 5/6 (Geological Society of America 1991). No free liquid was present. The sample was listed as dry. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GP02015G

No description was provided.

Photographic Description P9GP02015G

The sample had white and multicolored clumps of material. The white clumps were semi-soft. It was noted that the sample does not resemble an inorganic red-alone sludge as provided in the training sessions. There were no characteristics that qualify this sample as a Series 741 inorganic sludge as described in Course Number 300GM028, "Waste Identification, Excavation, Segregation/Sorting, and Disposition."

Table C-3. Data summary table for sample P9GP02015G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GP02015G	Inorganic sludge	2,310 ± 190	8,500 ± 1,200	2,170 ± 400	102 ± 21

Figure C-3. A photographic image of sample P9GP03015G in a dish (left) in a jar (right).

Waste Description for P9GP03015G

Sample P9GP03015G was collected from scoop #1132 on February 2, 2004 at 12:55 hr. The sample was retrieved at a reach of 9.44 ft, an angle of 3.5 degrees, and a depth of 12.82 ft. The waste sample was collected from the same cart as samples P9GP01015G and P9GP02015G. The waste material was described as 1–5% soil content with the balance consisting of sludge. The bags were torn but pliable. The sludge characteristics were described as gray inside surrounded by an aggregate-looking coating. A specific clump of the waste had fibrous threads. The fibers were 1/4 in. long sticking out from the mass of waste. The fibers were described as asbestos in appearance. The waste was orange-yellow with flakes of rust. The sample was given a color rating of 5YR 5/6 (Geological Society of America 1991). No free liquid was present. The sample was listed as dry with no sheen present. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GP03015G

The drum orientation appeared random with approximately 11 drum ring parts exposed. The waste characteristics were documented as mostly soil with bag and drum pieces uncovered. The debris constituted less than 10% of the content. There were no distinguishing container markings. The drum integrity was recorded as limited integrity, only pieces. The integrity of the bag was listed as good. Very little moisture existed, and the soil was stained.

Photographic Description P9GP03015G

The sample was characterized in the field as an inorganic sludge. However, the pictorial description depicts the sample as fibrous white massive chunks that resemble an old paper towel soaked in acid and buried for more than 30 years. The sample colors associated with the sample are stated as brown, rust, yellow and white. The sample is similar to sample P9GP01015G. There were no characteristics that qualify this sample as a Series 741 inorganic sludge as described in Course Number 300GM028, “Waste Identification, Excavation, Segregation/Sorting, and Disposition.”

Table C-4. Data summary table for sample P9GP03015G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GP03015G	Inorganic sludge	26.5 ± 2.4	<13.5	17 ± 19	5.7 ± 9.4

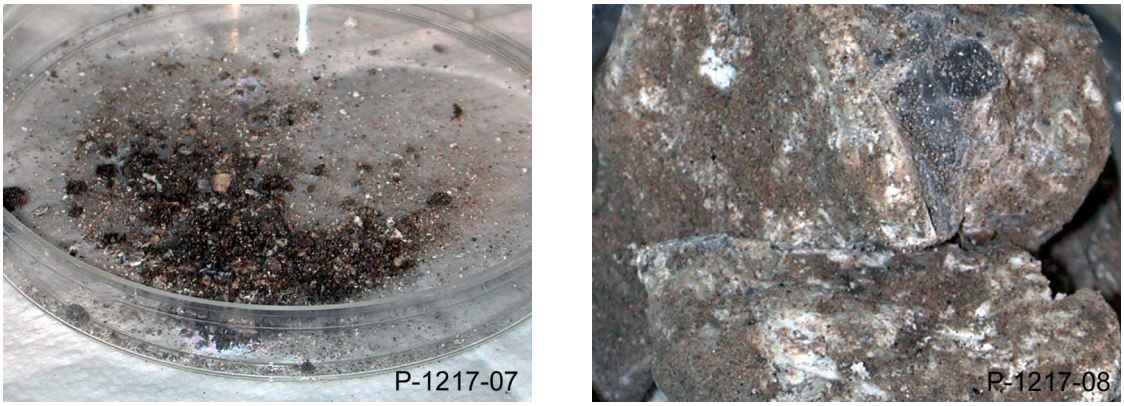

Figure C-4. A photographic image of sample P9GP04015G in a dish (left) in a jar (right).

Waste Description for P9GP04015G

Sample P9GP04015G was collected from scoop #1132 on February 2, 2004 at 12:55 hr at a reach of 9.44 ft, an angle of 3.5 degrees, and a depth of 12.82 ft. The waste sample was collected from the same cart as samples P9GP01015G, P9GP02015G, and P9GP03015G. The waste material was described as 1–5% soil content with the balance consisting of sludge. The sludge characteristics were described as gray inside surrounded by an aggregate-looking coating. A specific clump of the waste had fibrous threads. The fibers were 1/4 in. long sticking out from the mass of waste. The fibers were described as asbestos in appearance. The sample was given a color rating of 5YR 5/6 (Geological Society of America 1991). No free liquid was present. The sample was listed as dry with no sheen present. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GP04015G

The drum orientation appeared random with approximately 11 drum ring parts exposed. The waste characteristics were documented as mostly soil with bag and drum pieces uncovered. The debris constituted less than 10% of the content. There were no distinguishing container markings. The drum integrity was recorded as limited integrity, only pieces. The integrity of the bag was listed as good. Very little moisture existed, and the soil was stained.

Photographic Description P9GP04015G

The field characterization defined the sample as an inorganic sludge. The sample looked and felt like solid hard concrete pieces that were locked in the sample jar to the point where it appeared that the only way to remove them was to break the sample jar. The sample was difficult to subsample because of the large hard pieces trapped in the jar. A sufficient amount of loose material was available for subsampling; however, the gray concrete chunks were too difficult to handle. There were no characteristics that qualify this sample as a Series 741 inorganic sludge as described in Course Number 300GM028, “Waste Identification, Excavation, Segregation/Sorting, and Disposition.” Even though gray cement was present, the sample did not look like red adobe.

Table C-5. Data summary table for sample P9GP04015G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GP04015G	Inorganic sludge	2,210 ± 180	4,760 ± 440	1,010 ± 760	47 ± 64

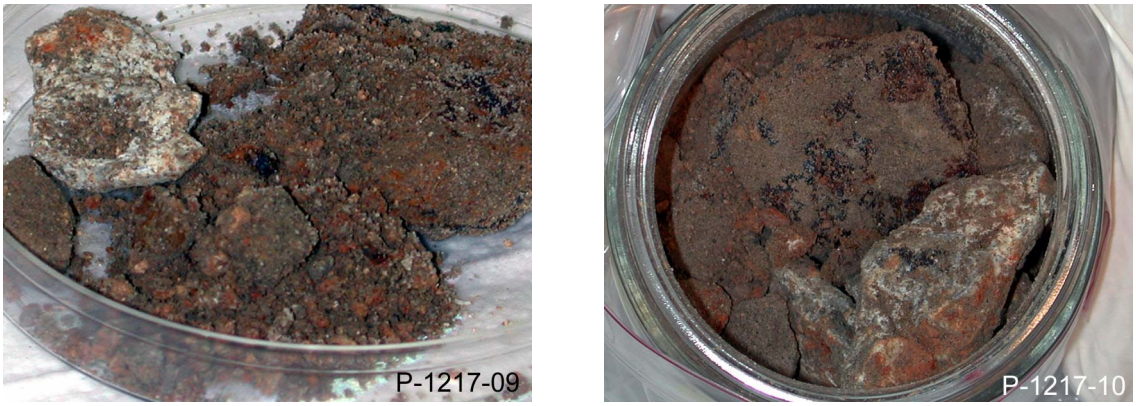

Figure C-5. A photographic image of sample P9GP05015G in a dish (left) in a jar (right).

Waste Description for P9GP05015G

Sample P9GP05015G was collected from scoop #1132 on February 2, 2004 at 12:55 hr at a reach of 9.44 ft, an angle of 3.5 degrees, and a depth of 12.82 ft. The waste sample was collected from the same cart as samples P9GP01015G, P9GP02015G, P9GP03015G, and P9GP04015G. The field characterization stated the sample to be an inorganic sludge. The waste material was described as 1–5% soil content with the balance consisting of sludge. The sludge characteristics were described as gray inside surrounded by an aggregate-looking coating. A specific clump of the waste in the cart had fibrous threads. The fibers were 1/4 in. long sticking out from the mass of waste. The fibers were described as asbestos in appearance. The waste was orange-yellow with flakes of rust. The sample was given a color rating of 5YR 5/6 (Geological Society of America 1991). No free liquid was present. The sample was listed as dry with no sheen present. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GP05015G

The drum orientation appeared random with approximately 11 drum ring parts exposed. The waste characteristics were documented as mostly soil with bag and drum pieces uncovered. The debris constituted less than 10% of the content. There were no distinguishing container markings. The drum integrity was recorded as limited integrity, only pieces. The integrity of the bag was listed as good. Very little moisture existed on the sample. The soil was stained.

Photographic Description P9GP05015G

The field characterization identified the sample as an inorganic sludge. However, the photographic description may question the field characterization. Rather, the sample appeared as chunks of cement and white solid rock. Small pieces of rust colored sample were present and defined as soil pieces mixed with drum rust. Other than the drum rust, there were no characteristics that qualify this sample as a Series 741 inorganic sludge as described in Course Number 300GM028, "Waste Identification, Excavation, Segregation/Sorting, and Disposition."

Table C-6. Data summary table for sample P9GP05015G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GP05015G	Inorganic sludge	1,600 ± 170	<253	1,100 ± 120	58.0 ± 7.3

Figure C-6. A photographic image of sample P9GR04012G in a dish (left) in a jar (right).

Waste Description for P9GR04012G

Sample P9GR04012G was collected as a probable Series 743 organic sludge sample from scoop #1128 on February 1, 2004 at 01:23 hr at a reach of 9.94 ft, an angle of 6 degrees, and a depth of 12.47 ft. The sludge was predominantly Moderate Yellow 5Y 7/6 in color with moist clumping clearly visible, and contained minor spotting that appeared as Moderate Reddish Brown 10R 4/6 to 10R 3/R (Geological Society of America 1991) flecks. No free liquids were present. A visual description classified the solid material as a probable organic sludge based upon its texture and appearance. When squeezed with a gloved hand, the material stuck together like peanut butter. A minor amount of soil appeared to cling to some of the external surfaces of the material in the transfer cart as a result of the excavation method. Greater than 90% of the contents of the transfer cart appeared as a sludge material free of soil. The sludge could be easily sampled and segregated from soil in the transfer cart. Samples free of a soil coating could be obtained. In the laboratory, after visual inspection and photographs, subsamples free of soil were obtained for analysis.

During the excavation retrieval process, the drum liner containing the sludge was initially intact and pliable. The organic materials originally present in the sludge appeared to be retained due to the intact and pliable drum liner. As the excavator arm acquired the scoop of material, the liner broke due to shear forces. Much of the sludge remained in the scoop.

Description of Dig Face P9GR04012G

As noted in the OU 7–13/14 field representative logbook, the waste drum was located at an approximate depth of 14.47-ft and was severely corroded; however, the liner was intact until contact with the backhoe bucket. The drum did not have any visible or legible container markings. The scoop was retrieved from the right half center section of the active waste zone.

Photographic Description and Subsampling Notes for P9GR04012G

The sample was light tan in appearance. The color code description was given as Moderate Yellow 5Y 7/6 with Moderate Reddish Brown 10R 4/6 (Geological Society of America 1991) spots intermittently dispersed throughout. Photograph P-1217-11 above (Figure C-6) is the sludge sample removed from the original 250 mL jar (P-1217-12) and placed via clean spatula into a Petri sampling dish. The sample consistency resembled that of clumped peanut butter.

Table C-7. Data summary table for sample P9GR04012G.

Field Sample	Field Characterization	Gamma Spectroscopy		ICP-MS	
		^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GR04012G	Organic sludge	2,420 ± 200	<840	6,000 ± 4,400	300 ± 230
		K_d (mL/g)			
Field Sample	pH	^{235}U	^{238}U	^{239}Pu	^{241}Am
P9GR04012G	11.78 ± 0.04	24,700 ± 4,600	24,200 ± 2,600	N/D	68,000

Figure C-7. A photographic image of sample P9GR20012G in a dish (left) in a jar (right).

Waste Description for P9GR20012G

Sample P9GR20012G was collected from scoop #1133 on February 2, 2004 at 14:20 hr at a reach of 11.02 ft, an angle of 4 degrees, and a depth of 13.02 ft. The sample contained small bits of corroded drum and Lucite®. The composition of the sample was 98% loose and clumped soil heavily mixed with probable Series 743 organic sludge. Clumps were easy to break apart (friable). The color description of the sludge in the soil ranged from very orange to red with the hue defined as 10R 4/6 (Geological Society of America 1991). There was no apparent organic sheen associated with the sludge and no free liquids were reported. Other than sludge mixing, the soil looked normal in appearance. The scoop was acquired from loose materials not confined to a specific drum.

Description of Dig Face P9GR20012G

As noted in the logbook, assessment of drum organization was impossible. The waste characteristics consisted of loose soil and sludge that were not confined to a drum or an intact drum liner. There were no container markings on any adjacent drums and drums were heavily corroded.

Photographic Description and Subsampling Notes for P9GR20012G

The sample was recorded as having red, brown, and gray chunks along with loose soil mixed with probable Series 743 organic sludge. The presence of paper and plastic was noted. The red chunks were identified as probable Series 743 organic sludge. The gray pieces were unidentifiable. Subsamples were collected that were free of plastic and paper. Samples are expected to have a high degree of heterogeneity.

Table C-8. Data summary table for sample P9GR20012G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GR20012G	Organic sludge	1,540 ± 130	<320	1,560 ± 320	76 ± 16
		K_d (mL/g)			
Field Sample	pH	^{235}U	^{238}U	^{239}Pu	^{241}Am
P9GR20012G	9.76 ± 0.12	35,600 ± 7,300	39,000 ± 12,000	N/D	59,000 ± 21,000

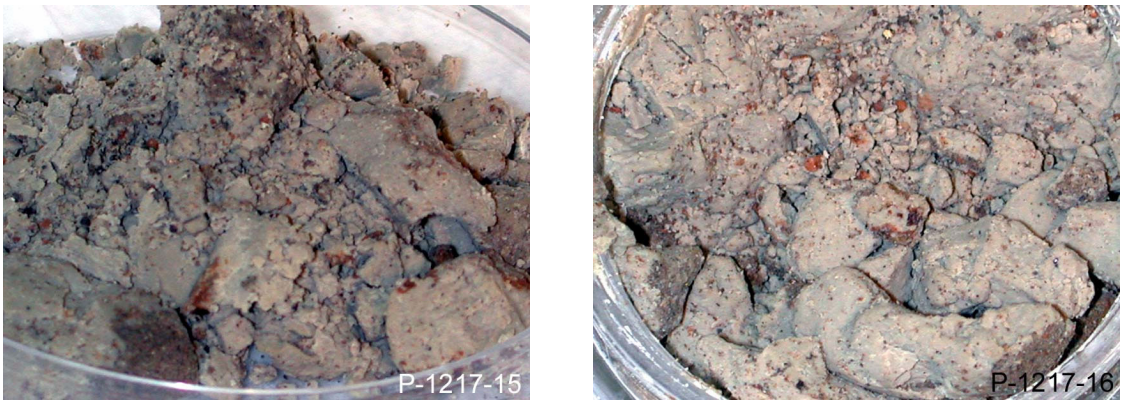

Figure C-8. A photographic image of sample P9GR23012G in a dish (left) in a jar (right).

Waste Description for P9GR23012G

Sample P9GR23012G was collected from scoop #1248 on February 12, 2004 at 21:28 hr at a reach of 4.63 ft, an angle of 9 degrees, and a depth of 11.79 ft. The material placed into the transfer cart included grapefruit size chunks of machined graphite. One chunk of sludge was large enough to fill two sample jars. The sludge chunk was crusted with soil and rust and appeared like compact clay or window sealing putty. The material's color was reported as olive gray with a hue of N8 (Geological Society of America 1991). There were no free liquids present. No other descriptive markings were apparent. Drum liner integrity from which the scoop was acquired was in fairly good condition. The scoop contents emptied into the transfer cart appeared to be a 50/50 mix of soil and debris. The sludge chunk was segregated and sampled. The sample could be molded into a ball with the gloved hand and retain its shape. Since this sample was obtained from the same transfer cart as sample P9GR22012G, the sample label was double-checked.

Description of Dig Face P9GR23012G

The drum organization appeared to be dumped rather than stacked. There was much debris present in the pit. Drums were corroded. Plastic was present in this location. Some of the plastic was identified as old glovebox gloves. No container markings were noted. Soil moisture was high.

Photographic Description and Subsampling Notes for P9GR23012G

In the laboratory, the sample was removed from the container, visually inspected, and photographed. The sample's initial color was light brown to gray. Sample drying may have occurred causing a lightening of the sludge color. The material could be balled up and retain its shape. The presence of drum rust was recorded in the sample. The sample was a probable Series 743 organic sludge. Subsamples of the gray/light brown material were acquired for analysis. Subsamples free of obvious soil contaminant could be obtained, whereas subsamples free of drum rust could not easily be obtained.

Table C-9. Data summary table for sample P9GR23012G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GR23012G	Organic sludge	4.27 ± 0.39	<8.76	12 ± 11	54 ± 56
		K_d (mL/g)			
Field Sample	pH	^{235}U	^{238}U	^{239}Pu	^{241}Am
P9GR23012G	8.90 ± 0.05	8,500 ± 3,800	21,800 ± 9,000	N/D	N/D

Figure C-9. A photographic image of sample P9GT01016G in a dish (left) in a jar (right).

Waste Description for P9GT01016G

Sample P9GT01016G was collected from scoop #1133 on February 2, 2004 at 16:44 hr at a reach of 11.02 ft, an angle of 4 degrees, and a depth of 13.02 ft. The waste sample was associated with a probable Series 743 organic sludge sample P9GR20012G. The field characterization identified the sample as interstitial soil. The waste material in the cart contained 98% loose soil with small bits of corroded drum. The moisture content was noted as dry-moist with no visible sheen. The small bits of probable sludge colors were stated as 10YR 4/2 (orange/red) (Geological Society of America 1991). The sample collected as an interstitial soil was stated as a sandy loam material. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GT01016G

Waste material was loose and not confined to a drum. There were no drum markings as all but the rings were corroded.

Photographic Description P9GT01016G

Sample P9GT01016G appears to be primarily soil with small pieces of white cloth and some rust present.

Table C-10. Data summary table for sample P9GT01016G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GT01016G	Soil possibly mixed with sludge	157 ± 12	<46	340 ± 480	16 ± 21

Figure C-10. A photographic image of sample P9GT02016G in a dish (left) in a jar (right).

Waste Description for P9GT02016G

Sample P9GT02016G was collected from scoop #2090 on February 2, 2004 at 16:51 hr at a reach of 7.42 ft, an angle of 6 degrees, and depth of 12.24 ft. The field characterization identified the sample as interstitial soil. The waste material was collected because a stained clump approximately the size of a tennis ball was present and looked unusual. The waste material in the cart was listed as containing 99% soil and small rusted bits of corroded drum and cardboard. The clump of waste material was surrounded by random soil in the cart. Clumps of probable Series 743 organic sludge were present in the cart but were not sampled. The waste cart contained two pieces of "blackish" material that resembled resin or corrosion products. There did not appear to be any free liquid present. The material that was samples was stained and had no sheen. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GT02016G

There was no evidence of drum organization or stacking. The waste material looked like soil. The drum color and container markings were not applicable as the drum was not present, only shredded pieces of the bag were present.

Photographic Description P9GT02016G

The field characterization defined the sample as interstitial soil. The sample visually consisted of greater than 90% soil with small pieces of white cloth and some rust particles present. Red materials shown in Figure 12 are apparent drum rust.

Table C-11. Data summary table for sample P9GT02016G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GT02016G	Soil possibly mixed with sludge	448 ± 42	<500	880 ± 850	43 ± 41

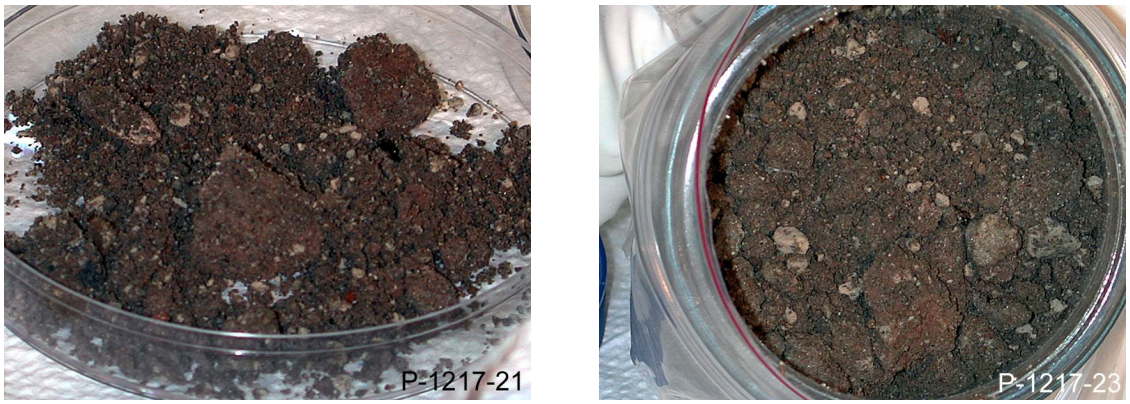

Figure C-11. A photographic image of sample P9GT03016G in a dish (left) in a jar (right).

Waste Description for P9GT03016G

Sample P9GT03016G was collected from scoop #1202 on February 8, 2004 at 21:14 hr at a reach of 8.65 ft, an angle of 5 degrees, and a depth of 15.12 ft. The contents in the transfer cart were described as clumped soil acquired from the base of the angle of repose with minor amounts of pea-sized foreign material believed to have been sludge and some bright white, granular, unidentifiable material. Base soil hue was given as 5Y 7/2 (Geological Society of America 1991), and soil was dry with no organic sheen.

Description of Dig Face P9GT03016G

The scoop was acquired from arc 4 to 5 degrees, containing mostly soil, some whitish material mixed in (not Lucite® or paper). The observer reported a large mass of apparent putty-looking sludge; probably Series 743 organic sludge.

Photographic Description and Subsampling Notes for P9GT03016G

The sample appeared to be soil mixed 50/50 with small, pea-sized amorphous clumps of off-white material. A high degree of heterogeneity is expected for this sample due to soil or foreign material mixing.

Table C-12. Data summary table for sample P9GT03016G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GT03016G	Soil mixed with sludge	14.82 ± 0.93	<4.5	14 ± 11	2.3 ± 1.0
		K_d (mL/g)			
Field Sample	pH	^{235}U	^{238}U	^{239}Pu	^{241}Am
P9GT03016G	8.93 ± 0.13	950 ± 510	2,250 ± 750	2,400 ± 1,300	6,400 ± 3,900

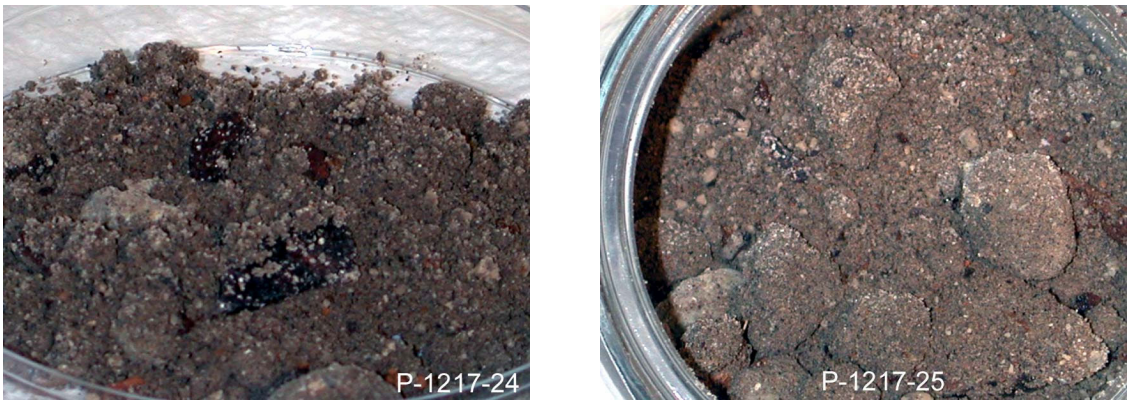

Figure C-12. A photographic image of sample P9GT04016G in a dish (left) in a jar (right).

Waste Description for P9GT04016G

Sample P9GT04016G was collected as a probable interstitial soil sample from scoop #2151 on February 8, 2004 at 21:39 hr at a reach of 7.47 ft, an angle of 7 degrees, and a depth of 13.70 ft. The scoop was obtained from consolidated soil at the base of P9-04. The field characterization identified the sample as interstitial soil. The soil was predominantly dark yellow brown 10YR 4/26 (Geological Society of America 1991). The sample was granular with some white granular inclusions. No free liquid was present. No absorbed liquid was observed. The texture and consistency was unremarkable soil in nature and well broken up. The excavator bucket uniformly broke up the sample. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GT04016G

No details were provided.

Photographic Description P9GT04016G

The field characterization defined the sample as interstitial soil. Visually the sample was mostly soil with small clumps of white/off-white to gray-white material amorphous phases. Some pieces of rusted drum were present in the sample.

Table C-13. Data summary table for sample P9GT04016G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GT04016G	Soil with <1% sludge	1.36 ± 0.12	<5.6	1.23 ± 0.39	4.5 ± 3.2

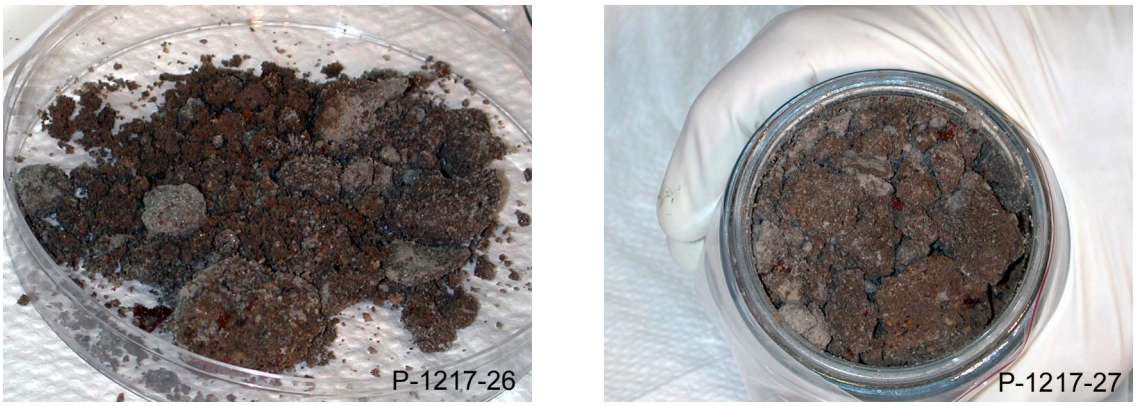

Figure C-13. A photographic image of sample P9GT05016G in a dish (left) in a jar (right).

Waste Description for P9GT05016G

Sample P9GT05016G was collected from scoop #1202 on February 8, 2004 at 21:16 hr at a reach of 8.65 ft, an angle of 5 degrees, and a depth of 15.12 ft. The sample weighed 1.23g. The sample was collected as an interstitial soil sample. The sample was dark yellow brown 10YR 4/2 (Geological Society of America 1991). The sample was clumped and consolidated with off-white granular inclusions. The sample did not appear to have any identifiers of a sludge sample. Little or no sludge from the drum immediately behind the sample was present in the scoop. Neither free liquid nor absorbed liquid were present. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GT05016G

No description was provided.

Photographic Description P9GT05016G

The sample appeared to be soil mixed 50/50 with an unidentifiable off-white, amorphous substance. Clumps of clay and off-white material were present. Colors were off-white to gray.

Table C-14. Data summary table for sample P9GT05016G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GT05016G	Soil with <1% sludge	27.0 ± 1.7	<5.6	16 ± 12	1.29 ± 0.85
		K_d (mL/g)			
Field Sample	pH	^{235}U	^{238}U	^{239}Pu	^{241}Am
P9GT05016G	9.45 ± 0.10	11,900 ± 3,100	15,300 ± 4,500	N/D	N/D

Figure C-14. A photographic image of sample P9GT06016G in a dish (left) in a jar (right).

Waste Description for P9GT06016G

Sample P9GT06016G was collected from scoop #2151 on February 8, 2004 at 21:38 hr at a reach of 7.47 ft, an angle of 7 degrees, and a depth of 13.70 ft. The sample weighed 0.98g. The sample was retrieved from the base of probe P9-04 as a consolidated soil. The field characterization described the sample as an unremarkable soil sample, granular, crumbly, and well broken up. The color was defined as 10YR 4/2 (Geological Society of America 1991), which is a dark yellow-brown. Small off-white granules were present in the sample. No pieces of bags or other material were evident. No sludge characteristics were obvious. In the laboratory, after visual inspection and photographs, subsamples were obtained for analysis.

Description of Dig Face P9GT06016G

No description was provided.

Photographic Description P9GT06016G

The field characterization identified the sample as interstitial soil. Visually, the soil sample had clumps of off-white/gray material mixed with soil. The off-white to gray materials present in the sample were described as amorphous.

Table C-15. Data summary table for sample P9GT06016G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GT06016G	Soil with <1% sludge	1.16 ± 0.12	<5.0	1.9 ± 1.9	4.3 ± 2.0

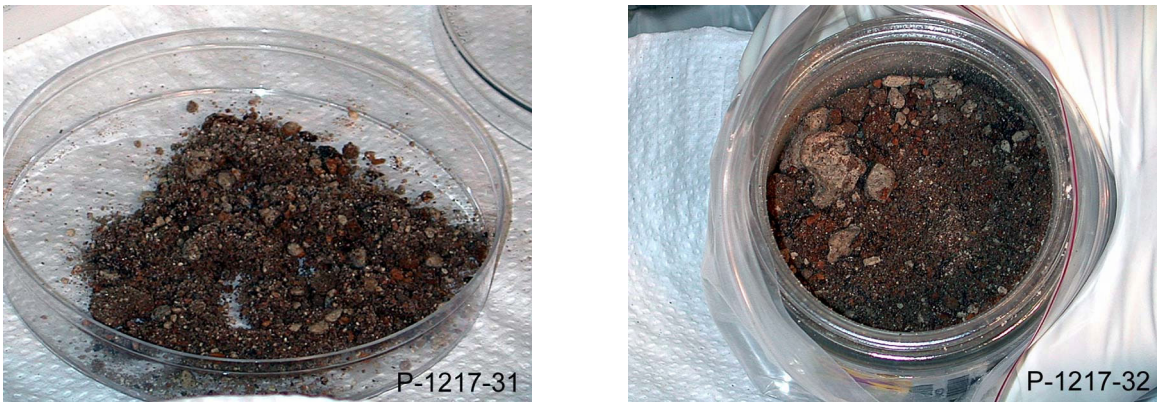

Figure C-15. A photographic image of sample P9GT07016G in a dish (left) in a jar (right).

Waste Description for P9GT07016G

Sample P9GT07016G was collected from scoop #1246 on February 11, 2004 at 09:58 hr at a reach of 7.12 ft, an angle of 8 degrees, and a depth of 13.06 ft. The justification for this particular sample was recorded as the soil was near a rusted drum that contained probable Series 743 organic sludge. The sample appeared to contain mostly soil and rust from the drum. The soil was moist in this area of the pit. The color features of the probable Series 743 organic sludge present nearby in the corroded drum were detailed as orange and rust colored. The interstitial soil characteristics were specified as rust and dry with various colored soil. No organic sheen was present on the soil. The sample had a high moisture content; enough that if compressed the sample would stay in a ball.

Description of Dig Face P9GT07016G

The excavation area contained much debris. Debris was staged in one area to the right of the dig and contained rusted drum parts, plastic, and pieces of graphite moldings. Several drums had been damaged and spread in this area.

Photographic Description and Subsampling Notes for P9GT07016G

This sample was obviously not a clean soil sample. The sample contained varied colored bits of rusted drum, gray sludge, and soil particles.

Table C-16. Data summary table for sample P9GT07016G.

		Gamma Spectroscopy		ICP-MS	
Field Sample	Field Characterization	^{241}Am (nCi/g)	$^{239+240}$ Pu (nCi/g)	^{241}Am (nCi/g)	^{239} Pu (nCi/g)
P9GT07016G	Soil mixed with sludge	0.919 ± 0.063	5 ± 13	2.57 ± 0.99	7.00 ± 0.99
		K_d (mL/g)			
Field Sample	pH	^{235}U	^{238}U	^{239}Pu	^{241}Am
P9GT07016G	7.97 ± 0.19	180 ± 130	410 ± 280	3,200 ± 1,100	N/D